EGS Abstract for The Hague, 1999

ON THE FAST EVALUATION METHOD OF TEMPERATURE AND GAS MIXING RATIO WEIGHTING FUNCTIONS FOR REMOTE SENSING OF PLANETARY ATMOSPHERES IN THERMAL IR AND MICROWAVE

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Evaluation of weighting functions in the atmospheric remote sensing is usually the most computer–intensive part of the inversion algorithms. We present an analytic approach to computations of temperature and mixing ratio weighting functions that is based on our previous results but the resulting expressions use the intermediate variables that are generated in computations of observable radiances themselves. Upwelling radiances at the given level in the atmosphere and atmospheric transmittances from space to the given level are combined with local values of the total absorption coefficient and its components due to absorption of atmospheric constituents under study. This makes it possible to evaluate the temperature and mixing ratio weighting functions in parallel with evaluation of radiances. This substantially decreases the computer time required for evaluation of weighting functions. Implications for the nadir and limb viewing geometries are discussed.

Abstracts to be submitted on or before December 15, 1998 to

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Submittal Information

1.	Conference	EGS, 1999
2.	Submission type	Update/correction
3.	Title	ON THE FAST EVALUATION METHOD OF TEMPERATURE AND GAS MIXING RATIO WEIGHTING FUNCTIONS FOR REMOTE SENSING OF PLANETARY ATMOSPHERES IN THERMAL IR AND MICROWAVE
4.	Author(s)	USTINOV, E.A.
5.	Session	PS4. Atmospheres of terrestrial planets, outer planets and moons
6.	Organizer	Dr. F. Hourdin, Dr. S. R. Lewis
7.	Equipment	NONE
8.	Support Award	NONE
9.	Presentation	Oral or poster presentation, no preference
10.	Abstract type	LaTeX
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